NET 26 / 30C 250 KHz Ethernet Data Acquisition

✱ general description

The NET 26/30C is an ethernet type analog data acquisition device. The device makes use TCP / IP over ethernet and the EDR Enhanced Remote Device protocol connecting at 10 mega bits per second or 100 mega bits per second network. The protocols are built into the EDR Enhanced application interface and the user requires no knowledge of network programming. The NET 26/30C has built-in ethernet networking capabilities and TCP / IP stack. This means that the device can be connected to any existing ethernet network.

The analog resolution is 16-bits and can have either 16 or 32 analog input channels. The 26 version only has analog inputs and the 30 version has both analog input and outputs. The device only supports streaming via analog inputs at a maximum rate of 250KHz and single writes for analog outputs. The analog input streaming channels is configured via a channel list. Streaming is packet based and not continuous.

All Ethernet µDAQ devices ship with the EDR Enhanced Software Development kit containing the EDR Enhanced Application Program Interface (API). The EDR Enhanced API implements a standard function set ensuring that all functionality stays the same for different interface types. This allows for switching between Ethernet and other interface topologies, like USB, without any software change. It also makes it possible to use Ethernet technology without any knowledge of TCP/IP network programming.

✱ features

- Ethernet 10/100 Mbps compatible.
- Automatic link speed detection.
- Support remote setup and firmware upgrade.
- No knowledge of network programming is needed
- Support for up to 32 analog input channels
- Support for up to 4 analog outputs channels
- Analog input sampling @ 250Khz via channel list
- Powered by an external power supply
- Dimensions:
  - 26/30C16: 45(H) x 80(W) x 148(L) mm
  - 26/30C32: 60(H) x 80(W) x 148(L) mm

✱ ordering information

Device	Analog Inputs	Analog Outputs	Bus Type
NET 26C16	16	0	ETHERNET 10 / 100 Mbps
NET 30C16	16	4	ETHERNET 10 / 100 Mbps
NET 26C32	32	0	ETHERNET 10 / 100 Mbps
NET 30C32	32	4	ETHERNET 10 / 100 Mbps
NET 26C16-BNC	16	0	ETHERNET 10 / 100 Mbps
NET 30C16-BNC	16	4	ETHERNET 10 / 100 Mbps

✱ absolute maximum electrical ratings

Parameter	Symbol	Condition	Rating	Unit
Digital Input Voltage	Vdi	**Ta = 25 ºC with respect to ground -**	-0.5 to 5.5	V
Digital Output Voltage	Vdo		-0.5 to 5.5	V
Digital Output Current	Vdoc		±2.0	mA
Analog Input Voltage	Vai		±12	V
Analog Output Voltage	Vao		±10	V
Analog Output Current	Vac		±5.0	mA
Storage Temperature	Tst	-	-50 to 150	ºC
Operating Temperature	Tot	-	0 to 70	ºC
Power Dissipation	Pd	Ta = 25ºC	4.95	W

✱ digital I/O electrical characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input High	Vih	Ta = 25ºC with respect to ground	2.2		5.5	V
Input Low	Vil		-0.3		0.8	V
Output High	Voh		3.7	5.0		V
Output Low	Vol			0.0	0.4	V
Output Source/Sink Current	Io				2.0	mA
Input Source/Sink Current	Ii		-1		1	µA

✱ digital I/O properties

Parameter	Type
Logic Compatibility	5V & 3.3V TTL Logic Levels
Device Compatibility	Intel 82C55
Maximum read / write speed	< 4ms *
Channels	24 I/O @ 3 x 8-bi

*Dependant on TCP/IP network traffic and routing.

✱ analog input

Parameter	Condition	Specification	Unit
Number of Channels	Ta = 25 ºC	16 / 32	-
Resolution		16	-
Input Range		±10	V
Input Impedance		2	MΩ
Relative Accuracy		±2	LSB
Conversion Source		Internal & External	-
Trigger Source		Internal & External	-
*Acquisition Speed - Streaming		250	KHz
**Block depth		128 to 262144	KS
***Acquisition Speed – Single Reads		< 4	ms

* Data is streamed in blocks.
** Block size is configurable.
***Dependant on TCP/IP network traffic and routing.

✱ analog output (NET 30C only)

Parameter	Condition	Specification	Unit
Number of Channels	Ta = 25 ºC	4	-
Resolution		16	bit
Output Range		**±10**	V
Output Current		±5	mA
Relative Accuracy		**2**	LSB
Zero Offset Error - Maximum		2	LSB-
Settling Time		2	µs-
Power On State		0	V
*Acquisition Speed		<4	ms

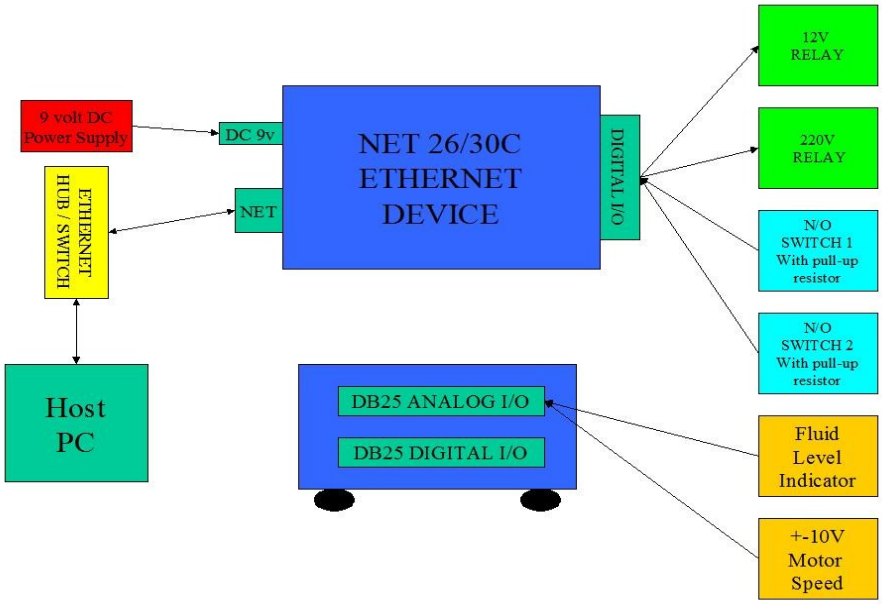
*Dependant on TCP/IP network traffic and routing.

✱ software operation characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Digital read operation	Dir	No other network traffic @ 100 Mbps		< 4		Milliseconds
Digital write operation	Dow			< 4		Milliseconds
Analog read operation	Ard			< 4		Milliseconds
Analog write operation	Awr			< 4		Milliseconds

✱ operation

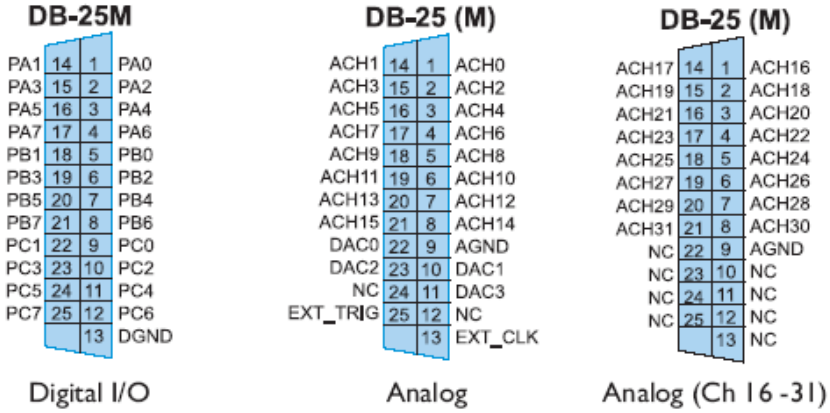
The Figure below shows a typical setup of how to connect to an Ethernet µDAQ device. The device is connected to an existing Ethernet network. It also needs an external power supply and external equipment via the DB25 connecters. The device runs an onboard operating system and listens to network connections continuously. When the host computer makes a TCP/IP connection, it can execute commands sent via the EDR Enhanced TCP/IP protocol. This protocol allows for digital I/O, analog input and analog output commands. It also has a facility to notify the host computer of interrupts. The EDR Enhanced network protocol can also update the unit's firmware remotely, change the network setup and query device properties.



The device can be used to switch relays, mechanical or solid-state. The output is a normal TTL signal therefore the line needs to be buffered to be able to drive the relay. Each application will differ but for a common solution the PC38V will serve as an I/O buffer module. For a more standard installation make use of the PC38G, a mechanical relay module, or the PC37D, a solid-state relay module.

The Ethernet µDAQ can also be used to monitor digital inputs. A simple interface is a normally open switch with a pull-up resistor. In this case the line will stay high until the switch is closed. For digital inputs the best option would be to optically isolate it. For this purpose the PC43E can be used. This is an eight-channel optical-isolation module.

The analog input sub-system allows the unit to read single voltages or to stream them via a pre-configured channel list. When doing single reads the user application will request a channel to be read via the API. The API in turn will send the appropriate EDR Enhanced TCP/IP commands to the unit. In streaming mode the channels are scanned according to the channel list. Data are assmbled in packages and send to the host computer. The API will keep data in a circular buffer and the user can restrieve data when need too. Timing between channels are consistent within a single packet, but not across packets. The figure below show the pin assigments of the different connecters found on the various models of the NET 26/30C.



✱ optional accessories

The Ethernet µDAQs can be used with a wide range of accessories. The table below shows a list of accessories that are compatible with the digital I/O and analog I/O Ethernet series of devices.

ADPT-25103	µDAQ Digital I/O Adapter. Split into 3 x IDC10 connecters.
ADPT-25-S	Short MicroDAQ mini Screw Terminal Adaptor
ADPT-25-M	Medium MicroDAQ mini Screw Terminal Adaptor
DB25M/F	DB25 (M) to DB25 (F) Multi-core Screened Cable
ADPT-2526	DB25 (F) & IDC26 (M) to 27way Screw Terminal Adaptor
PC-52A2	Multi I/O Adaptor (2x) 8ch; (4x) 4ch Analog I/P; (1x) 4ch Analog O/P
PC-43A2	Multi I/O Adaptor (1x) 16ch; (3x) 8ch Digital I/O
PC-37D	8 Channel Opto-22 Solid State Relay Module
PC-37E	16 Channel Opto-22 Solid State Relay Module
PC-37F	24 Channel Opto-22 Solid State Relay Module
PC-38X	24 Channel I/O Driver Module
PC-43E	8Channel Digital Opto-Isolator I/P Module
PC-43B	16 Channel Digital Opto-Isolator I/P Module
PC-43C	24 Channel Digital Opto-Isolator I/P Module

✱ software support

All µDAQ products are supported by the EDR Enhanced Software Development Kit and have operating system drivers for Windows and Linux. The EDR Enhanced SDK provides many examples for all popular programming environments.

The EDR Enhanced API implements the network protocol therefore no knowledge of network programming is needed. The digital I/O and counter-timers functions are transparent across the network. This property makes it easy to switch from USB or PCI to Ethernet without recompiling or changing the software.

Development support

- C++, Windows and Linux
- Borland Delphi
- Borland C++ builder
- Visual Studio .NET
- Java
- KDevelop & QT
- Labview

✱ contact details

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✱ document history

The table below lists the document history. A minor revision change will indicate document errors that are edited. A major revision change will indicate an update or change to the document contents or structure.

Revision	Date	Comments
1.3	6/3/2008	Add ADPT-25103 to the accessory list.
1.2	5/3/2008	Amend A/D streaming specification.
1.1	31/08/2007	Minor text changes.
1.0	20/08/2007	Original Release.

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